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MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

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US EPA RECORDS CENTER REGION 5



TO: Dave Haywood  
Land Resource Programs

FROM: William Fryer and Dave Bechler  
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SUBJECT: BASF-Wyandotte Firestone Site  
Sec. 5, T4S, R11E, Grosse Isle Twp., Wayne Co.

The contaminated materials located on this site present a potential danger for contamination of both the adjacent Trenton Channel of the Detroit River and the groundwater in the glacial drift and underlying bedrock. The contaminants are a wide range of inorganic and organic wastes, residues, and by-products resulting from various industrial and chemical manufacture. These materials have been landfilled along with other garbage and rubble, all of which are interbedded with soil materials in a number of horizons.

The glacial drift in the area is comprised of a lacustrine clay having a number of distinct horizons. Borings describe two beds of stiff brown and gray clay overlying a medium silty clay. There is some sand and/or gravel on sand seams in these strata. There may be a thin bed of sand and gravel beneath in some places, overlying bedrock. A thin veneer of lake sand is found along the shoreline extending north. A portion of the site along the river was originally under water and some of the adjacent area was swamp. This shows up on the borings as a black organic silt beneath the fill.

Bedrock is probably the very bottom of the Dundee limestone, but may be the top of the Detroit River formation. This is described as a soft grey weathered dolomite and/or limestone. The surface of the bedrock is fragmented and the formation appears to be relatively permeable. Groundwater produced from the bedrock locally has been found to contain levels of  $H_2S$  in excess of 47 ppm. Additionally it is highly mineralized, containing levels of  $SO_4$  above 1400 ppm and excessive hardness. Lesser amounts of  $H_2S$  are common throughout the area, and the high sulphate is also found in the underlying Sylvania sandstone.

Groundwater supplies in the drift are not common. When necessary, dug wells or wells that encountered a near surface sand lense were employed. ~~The entire area is currently tied into the Detroit water system.~~ There are a few bedrock wells on Grosse Isle completed at various depths, and BASF Wyandotte has some shallow observation wells on their property.

The hydrogeology of the site implies ~~fairly restricted groundwater movement due to the relatively impermeable materials found surrounding it.~~ It is generally conceded that groundwater movement is towards the river. The Dames and Moore Report supports this, but does not extend observations out into the surrounding area. However, the topographic map shows the Mongaunon Creek cuts off the near shoreland from the upland at a level below those water levels reported on the site. The actual status of groundwater on site should be determined, which may require some off site data.

Also ~~uncertain is the relationship between the piezometric head in the bedrock, the water table in the fill, and river level.~~ Circumstantial evidence suggests that the head in the bedrock is approximately 10 feet below river level, but this needs investigation. A bedrock observation well will be required, and background water quality should be obtained. Additionally, samples taken at closely spaced intervals through the underlying clay should be taken for analysis to determine the penetration of contaminants below the fill. The drilling procedure will be critical for insuring accurate results; the plan for this work should be submitted to the DNR for review before drilling is begun. This also brings up the question of the proper plugging of all the deeper borings done on site, especially those extending into the bedrock. We have no records of the procedures employed. This is important.

The cleanup of this site can follow either of the two approaches: (1) removal of contaminated material and treatment of contaminated groundwater; or (2) encapsulation of the contaminated material on site and prevention of groundwater movement to or from the site. Both approaches present real problems in handling the water that saturates the fill. An optimum solution will depend on a balance between conflicting factors and problems. In any case, important information necessary to judge the workability of different solutions is lacking. This includes data on contamination in the underlying clay, piezometric head in the bedrock, water table mapping around the site, and the effect of leachate on available containment wall materials.

TO: Dave Haywood

(3)

April 2, 1980

Containment on site presently appears to be an attractive solution due to the smaller scale of the work and the conjectured isolation of the fill materials as is. If groundwater movement to and from the site can be prevented or reduced to very low levels, a case could be made. Construction of a containment wall would be subject to stringent requirements for permeability and resistance to breakdown by leachate. The site is hand-capped by the high water level within the fill. This may be a limited condition, but it is a definite problem for materials placed below river level. Also, if the leachate is found to be moving vertically through the underlying clay, containment could not be assured. In any case, the construction of a containment wall keyed into the underlying clay would require dewatering of the excavation and regulated treatment of the water before discharge. The projected plans for the terminal may be adaptable to an overall solution which could include extending the foundation for the perimeter roadway into the underlying clay and constructing it as a wide, compacted clay fill to grade and final capping of the site with a combination of roadways, parking lots and warehouses.

Excavation of the entire fill covering the site and its removal to a hazardous waste landfill would be a more absolute solution. This would involve transport of saturated materials and require containment of the water drainage during transport. Also, the site would probably require dewatering during excavation, and this water would require treatment before discharge. The disposition of the deeper borings, especially those reaching bedrock, may be critical if they are found to be leaking and recharging the groundwater on site. Also, if contaminants are shown to have penetrated the underlying clay, excavation below the original land surface may be required. This could extend to below river level. Another consideration to be explored by groundwater mapping is the present groundwater flow into the site to determine what conditions would be encountered during excavation. The recharge of groundwater to this site is indeterminate, and may influence the workability of any solution.

In conclusion, further information on the site and surroundings is necessary to reasonably make plans for the cleanup. Any of the suggested solutions may be rendered unworkable or incomplete by some of the unknown conditions or inaccurate data we are working with.

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